

WHAT IS CLAIMED IS:

1. A modulation method comprising the steps of:  
generating a 6-bit output code word in response to every 4-bit  
5 input code word by referring to a set of encoding tables, wherein  
the encoding tables contain output code words assigned to input  
code words, and contain encoding-table designation information  
accompanying each output code word, wherein the encoding-table  
designa- tion information designates an encoding table among the  
10 encoding tables which is used next to generate an output code word  
immediately following the output code word accompanied with the  
encoding-table designation information; and  
sequentially connecting the generated output code words into  
a sequence of the generated output code words which follows  
15 predetermined run length limiting rules (1, k)RLL, where "k"  
denotes a predetermined natural number between 7 and 12.
2. A modulation method as recited in claim 1, wherein NRZI  
conversion results of output code words in first specified one of the  
20 encoding tables which are assigned to prescribed input code words  
are opposite in polarity to NRZI conversion results of output code  
words in second specified one of the encoding tables which are  
assigned to the prescribed input code words, and further  
comprising the steps of generating a first candidate current output  
25 code word in response to a current input code word equal to one of  
the prescribed input code words by referring to the first specified

5 wherein a succession of a specified immediately-preceding output code word and the first candidate current output code word and also a succession of the specified immediately-preceding output code word and the second candidate current output code follow the predetermined run length limiting rules (1, k)RLL.

3. A modulation method as recited in claim 2, further comprising the step of selecting one from the first and second candidate current output code words as a final current output code word.

4. A modulation method as recited in claim 2, further comprising the steps of:

20            updating a first DSV of the first candidate current output code  
word and previous final output code words in response to the first  
CDS;

25        updating a second DSV of the second candidate current output  
code word and previous final output code words in response to the

determining which of an absolute value of the first DSV and an absolute value of the second DSV is smaller; and

selecting one from the first and second candidate current

5. A modulation method as recited in claim 1, further comprising the steps of:

10        predicting repetition of a minimum run length at least a  
predetermined number of times in the sequence of the generated  
output code words; and

when the repetition of the minimum run length is predicted, changing an output code word causing the repetition to prevent the repetition of the minimum run length from occurring in the sequence of the generated output code words.

6. A modulation apparatus comprising:

means for generating a 6-bit output code word in response to every 4-bit input code word by referring to a set of encoding tables, wherein the encoding tables contain output code words assigned to input code words, and contain encoding-table designation information accompanying each output code word, wherein the encoding-table designation information designates an encoding table among the encoding tables which is used next to generate an output code word immediately following the output code word

accompanied with the encoding-table designation information; and

means for sequentially connecting the generated output code words into a sequence of the generated output code words which follows predetermined run length limiting rules (1, k)RLL, where

5 "k" denotes a predetermined natural number between 7 and 12.

7. A modulation apparatus as recited in claim 6, wherein NRZI

conversion results of output code words in first specified one of the encoding tables which are assigned to prescribed input code words

10 are opposite in polarity to NRZI conversion results of output code words in second specified one of the encoding tables which are

assigned to the prescribed input code words, and further

comprising means for generating a first candidate current output

code word in response to a current input code word equal to one of

15 the prescribed input code words by referring to the first specified

one of the encoding tables, and means for generating a second candidate current output code word in response to the current

input code word equal to said one of the prescribed input code

words by referring to the second specified one of the encoding

20 tables, wherein a succession of a specified immediately-preceding

output code word and the first candidate current output code word

and also a succession of the specified immediately-preceding output

code word and the second candidate current output code follow the

predetermined run length limiting rules (1, k)RLL.

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8. A modulation apparatus as recited in claim 7, further

comprising means for selecting one from the first and second candidate current output code words as a final current output code word.

- 5     9.     A modulation apparatus as recited in claim 7, further comprising:

          means for calculating a first CDS of the first candidate current output code word;

- means for updating a first DSV of the first candidate current  
10   output code word and previous final output code words in response to the first CDS;

          means for calculating a second CDS of the second candidate current output code word;

- means for updating a second DSV of the second candidate  
15   current output code word and previous final output code words in response to the second CDS;

          means for determining which of an absolute value of the first DSV and an absolute value of the second DSV is smaller; and

- means for selecting one from the first and second candidate  
20   current output code words which corresponds to the smaller DSV absolute value as a final current output code word.

10.   A modulation apparatus as recited in claim 6, further comprising:

- 25       means for predicting repetition of a minimum run length at least a predetermined number of times in the sequence of the

means for, when the repetition of the minimum run length is predicted, changing an output code word causing the repetition to prevent the repetition of the minimum run length from occurring in the sequence of the generated output code words.

10 recovering encoding-table designation information from the  
code-word sequence, the encoding-table designation information  
representing which of encoding tables has been used in generating a  
code word immediately following a code word of interest; and  
demodulating the code word of interest into an original code  
15 word by referring to a decoding table in response to the recovered  
encoding-table designation information.

12. A demodulation apparatus for demodulating a sequence of 6-bit code words which is generated by the modulation apparatus in claim 6, the demodulation apparatus comprising:

means for recovering encoding-table designation information from the code-word sequence, the encoding-table designation information representing which of encoding tables has been used in generating a code word immediately following a code word of interest; and

means for demodulating the code word of interest into an

original code word by referring to a decoding table in response to the recovered encoding-table designation information.

13. An information recording medium storing a sequence of code  
5 words which is generated by the modulation apparatus in claim 6.

14. An information transmission method of transmitting a  
sequence of code words which is generated by the modulation  
method in claim 1.

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15. An information transmission apparatus for transmitting a  
sequence of code words which is generated by the modulation  
apparatus in claim 6.